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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,738	08/28/2003	Suk Won Choi	049128-5124	5697

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EXAMINER
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QI, ZHI QIANG

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 01/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

10/649,738

Applicant(s)

CHOI ET AL.

Examiner

Mike Qi

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 September 2005 and 17 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4-9,12-16,19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-9,12-16,19 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on Nov.17, 2005 has been entered.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4-6, 9, 12, 15-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,514,426 (Eguchi) in view of US 6,614,491 (Hasegawa et al) and US 6,545,738 (Son et al).

Regarding claims 1, 9, 15 and 16, Eguchi discloses (col.5, lines 37 – 53; col.7, lines 23 – 30; Fig.1) that a liquid crystal display comprising:

- a liquid crystal (15) is disposed (injected ) between a pair of substrate (11a, 11b) (upper and lower plates) which coated with transparent electrodes (12a, 12b) (wherein the upper and lower plates have electrodes respectively formed thereon);

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- an upper alignment film (14a) formed on the upper plate (11a);
- a lower alignment film (14b) formed on the lower plate (11b);
- in order to provide the alignment film with a better alignment effect, it is preferred to rub the surface of the alignment film, and the rubbing is applied to only one of the substrates having an alignment film (col.7, lines 23-30), i.e., only one of the alignment film on the upper plate and the lower plate is aligned so as to determine an incipient alignment direction of the liquid crystal;
- assembling the upper plate and the lower plate in order to assemble the device,
- polarizers (17a,17b) mounted on external surfaces of the upper and lower plates (11a, 11b) respectively;
- using ferroelectric liquid crystal (col.5, lines 37-53).

Eguchi does not explicitly disclose that: 1) a tilt long axis of the liquid crystal (i.e., the optical axis of the liquid crystal molecules) is coincident with a transmission axis of at least one of the polarizers; and 2) using ferroelectric liquid crystal having Half V-Switching mode.

**Hasegawa** discloses (col.9, line 44 – col.10, line 6; Fig.1) that the transmitting axis of one polarizer (38) was parallel to the optical axis of the liquid crystal molecules (50), i.e., a tilted long axis of the liquid crystal is coincident with a transmission axis of one of the polarizers. Hasegawa indicates (col.9, lines 55-66) that in such case, the light

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was hardly leaked out from the non-pixel portion, so that a higher contrast and more wide viewing angle obtained.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display of Eguchi with the teachings of arrange a tilted long axis of the liquid crystal is coincident with a transmission axis of at least one of the polarizers as taught by Hasegawa, since the skilled in the art would be motivated for preventing the light leakage so as to obtain a higher contrast and more wide viewing angle display (col.9, lines 55-66).

Eguchi and Hasegawa teach the invention set forth above except for the ferroelectric liquid crystal having Half V-Switching mode.

**Son** discloses (col.1, lines 30-44; Fig.5) that the half V-shape FLC (ferroelectric liquid crystal) (see Fig.5 of half V-shape mode that is a half V-switching mode) has a primary alignment state better than that of the V-shape FLC, and the half V-shape FLC enhances a contrast ratio and enables the liquid crystal to be easily driven.

Therefore, it would have been obvious to those skilled in the art at time the invention was made to modify the liquid crystal display of Eguchi and Hasegawa with the teachings of using ferroelectric liquid crystal having half V-switching mode as taught by Son, since the skilled in the art would be motivated for enhancing the contrast ratio and driving the liquid crystal easily.

Regarding claims 4 and 5, Eguchi discloses (col.7, lines 23 – 30) that in order to provide the alignment film with a better alignment effect, it is preferred to rub the surface of the alignment film, and the rubbing is applied to only one of the substrates or both

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substrate each having an alignment film (to align the upper alignment film as claimed in claim 4 or to align the lower alignment film as claimed in claim 5).

Regarding claim 12, Eguchi discloses (col.11, lines 27 –43; Fig.4) that the orientation of the ferroelectric liquid crystal cell shows bistability; and when the electric field  $E_a$  is applied to the liquid crystal molecules, they are oriented in the first stable state (33a); and when the electric field  $E_b$  is applied to the liquid crystal molecules, the liquid crystal molecules are oriented to the second stable state (33b); and as long as the magnitude of the electric field being applied is not above a certain threshold value, the liquid crystal molecules are placed in the respective orientation states. Therefore, in order to obtain a certain orientation state, when injecting the liquid crystal between the two substrates, a certain electric field must be applied, and such electric field is for maintaining an incipient alignment direction of the liquid crystal.

Regarding claims 6 and 19, Eguchi discloses (col.5, lines 43 – 53) that the liquid crystal layer (15) with a thickness (cell gap) 0.1 – 3 microns which is sufficiently small to suppress the formation of a helical structure of the liquid crystal (15), and that the cell gap is overlap with the cell gap 1.4 – 1.5 microns as claimed in claims 6 and 19. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists (see MPEP 2144.05 I).

3. Claims 7-8, 13-14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eguchi, Hasegawa and Son as applied to claims 1, 4-6, 9,12, 15-16 and 19 above, and further in view of US 4,709,994 (Kanbe et al).

Regarding claims 7-8, 13-14 and 20, Eguchi, Hasegawa and Son teach the invention set forth above except for that a transmissive axis of one of the polarizers is at an angle within 1 to 10 degree (preferably 3 to 7 degree) with respect to alignment direction of aligned one of the alignment films.

Kanbe discloses (col.6, lines 48– 66; Fig.3) that under certain condition, forming an angle between the rubbing direction (axis O) (the alignment direction) and the transmission axis of a polarizer (axis P1) is 6 degree, the display having a maximum contrast. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists (see MPEP 2144.05 I).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display of Eguchi, Hasegawa and Son with the teachings of setting an angle 1 to 10 degree (preferable 3 to 7 degree) of a transmissive axis of a polarizer with respect to an alignment direction of the aligned one of the alignment films as taught by Kanbe, since the skilled in the art would be motivated for achieving a maximum contrast (col.6, lines 48– 66).

### ***Response to Arguments***

4. Applicant's arguments filed Sep. 19, 2005 have been fully considered but they are not persuasive.

1) The reference Eguchi is relied on to teach (col.5, lines 37 – 53; col.7, lines 23 – 30; Fig.1) that a structure of a liquid crystal display in which the rubbing is applied to only one of the substrates having an alignment film (col.7, lines 23-30), i.e., only one of

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the alignment film on the upper plate and the lower plate is aligned so as to determine an incipient alignment direction of the liquid crystal.

2) The reference Hasegawa is relied on to teach (col.9, line 44 – col.10, line 6; Fig.1) that the transmitting axis of one polarizer (38) was parallel to the optical axis of the liquid crystal molecules (50), i.e., a tilted long axis of the liquid crystal is coincident with a transmission axis of one of the polarizers.

3) The reference Son is relied on to teach (col.1, lines 30-44; Fig.5) that the half V-shape FLC (ferroelectric liquid crystal) has a primary alignment state better than that of the V-shape FLC, and the half V-shape FLC enhances a contrast ratio and enables the liquid crystal to be easily driven.

### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) US 4,639,089 (Okada et al) discloses (col.8, lines 22 – 44; Fig.2) that in order to effectively realize high response speed and bistability, it is preferable that the thickness of the cell is as thin as possible.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299.

The examiner can normally be reached on M-T 8:00 am-5:00 pm.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi  
January 3, 2006

*Andrew Schechter*  
ANDREW SCHECHTER  
PRIMARY EXAMINER